

CLAIMS

1. A method of separating a target gas from a gas mixture using a plurality of adsorption columns packed with an adsorbent, the
5 method comprising repeating a cycle for each of the adsorption columns, the cycle comprising:

an adsorption step in which said gas mixture is introduced into one selected adsorption column, an unnecessary component contained in said gas mixture is adsorbed into said adsorbent,
10 and a product gas enriched with said target gas is led out from said adsorption column;

a first pressure reduction step for lowering the internal pressure of said adsorption column to a first intermediate pressure by leading out a first led-out gas;

15 a second pressure reduction step for lowering the internal pressure of said adsorption column even further to a second intermediate pressure by leading out a second led-out gas;

a desorption step for desorbing at least a part of said unnecessary component from said adsorbent and purging said
20 unnecessary component;

a scrubbing step for introducing a scrubbing gas into said adsorption column and purging a purge gas from said adsorption column; and

a repressurizing step for raising the internal pressure
25 of said adsorption column by introducing a repressurizing gas into said adsorption column;

wherein said first led-out gas led out from said adsorption

column during said first pressure reduction step is introduced as said scrubbing gas into an adsorption column in which said scrubbing step is underway, and said second led-out gas led out from said adsorption column during said second pressure reduction step being introduced as said repressurizing gas into an adsorption column in which said repressurizing step is underway.

2. The target gas separation method according to claim 1, wherein said single cycle comprises an additional repressurizing step, performed after said repressurizing step, for raising the internal pressure of said adsorption column even further by introducing an additional repressurizing gas into said adsorption column,

a part of said product gas led out from the adsorption column in which said adsorption step is underway being introduced as said additional repressurizing gas into the adsorption column in which said additional repressurizing step is underway.

3. The target gas separation method according to claim 1, wherein said single cycle comprises an additional scrubbing step, performed after said scrubbing step, for introducing an additional scrubbing gas into said adsorption column and purging said purge gas from said adsorption column,

a part of said product gas led out from the adsorption column in which said adsorption step is underway being introduced as said additional scrubbing gas into the adsorption column in which said additional scrubbing step is underway.

4. The target gas separation method according to claim 1, wherein
when a minimum pressure in said adsorption column during said
desorption step is assumed to be 0% while a maximum pressure
5 in said adsorption column during said adsorption step is assumed
to be 100%, said first intermediate pressure is within a range
of 35 to 80%.

5. The target gas separation method according to claim 4, wherein
10 said second intermediate pressure is within a range of 15 to
50%.

6. The target gas separation method according to claim 1, wherein
said gas mixture contains hydrogen gas as said target gas, and
15 carbon dioxide gas as said unnecessary component.